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Operation and Maintenance
Manual Excerpt

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CATERPILLAR®

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Operation and Maintenance Manual

Challenger 65E, Challenger 75E, Challenger 85E and Challenger 95E Agricultural Tractors

6GS1-Up (Machine)
6HS1-Up (Machine)
6JS1-Up (Machine)
6KS1-Up (Machine)

Important Safety Information

Most accidents that involve product operation, maintenance and repair are caused by failure to observe basic safety rules or precautions. An accident can often be avoided by recognizing potentially hazardous situations before an accident occurs. A person must be alert to potential hazards. This person should also have the necessary training, skills and tools to perform these functions properly.

Improper operation, lubrication, maintenance or repair of this product can be dangerous and could result in injury or death.

Do not operate or perform any lubrication, maintenance or repair on this product, until you have read and understood the operation, lubrication, maintenance and repair information.

Safety precautions and warnings are provided in this manual and on the product. If these hazard warnings are not heeded, bodily injury or death could occur to you or to other persons.

The hazards are identified by the “Safety Alert Symbol” and followed by a “Signal Word” such as “DANGER”, “WARNING” or “CAUTION”. The Safety Alert “WARNING” label is shown below.

⚠ WARNING

The meaning of this safety alert symbol is as follows:

Attention! Become Alert! Your Safety is Involved.

The message that appears under the warning explains the hazard and can be either written or pictorially presented.

Operations that may cause product damage are identified by “NOTICE” labels on the product and in this publication.

Caterpillar cannot anticipate every possible circumstance that might involve a potential hazard. The warnings in this publication and on the product are, therefore, not all inclusive. If a tool, procedure, work method or operating technique that is not specifically recommended by Caterpillar is used, you must satisfy yourself that it is safe for you and for others. You should also ensure that the product will not be damaged or be made unsafe by the operation, lubrication, maintenance or repair procedures that you choose.

The information, specifications, and illustrations in this publication are on the basis of information that was available at the time that the publication was written. The specifications, torques, pressures, measurements, adjustments, illustrations, and other items can change at any time. These changes can affect the service that is given to the product. Obtain the complete and most current information before you start any job. Caterpillar dealers have the most current information available. For a list of the most current publication form numbers available, see the Service Manual Contents Microfiche, REG1139F.

⚠ WARNING

When replacement parts are required for this product Caterpillar recommends using Caterpillar replacement parts or parts with equivalent specifications including, but not limited to, physical dimensions, type, strength and material.

Failure to heed this warning can lead to premature failures, product damage, personal injury or death.

Safety Section

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Safety Signs and Labels

SMCS Code: 7000; 7405

There are several specific warning signs on this machine. The exact location of the hazards and the description of the hazards are reviewed in this section. Please become familiarized with all warning signs.

Make sure that all of the warning signs are legible. Clean the warning signs or replace the warning signs if you cannot read the words. Replace the illustrations if the illustrations are not visible. When you clean the warning signs, use a cloth, water, and soap. Do not use solvent, gasoline, or other harsh chemicals to clean the warning signs. Solvents, gasoline, or harsh chemicals could loosen the adhesive that secures the warning sign. Loose adhesive will allow the warning sign to fall.

Replace any warning sign that is damaged or missing. If a warning sign is attached to a part of the machine that is replaced, install a warning sign on the replacement part. Any Caterpillar dealer can provide new warning signs.

Do Not Operate

NOTICE
MACHINE IS DESIGNED TO OPERATE EFFICIENTLY IN GEARS 3 THROUGH 7. SUSTAINED OPERATION AT FULL LOAD IN FIRST GEAR MAY SHORTEN POWER TRAIN LIFE.
WARNING

Illustration 2 g00408354

The warning sign is located in the operator's compartment on the door.

WARNING

Do not operate or work on this machine unless you have read and understand the instructions and warnings in the Operation and Maintenance Manual. Failure to follow the instructions or heed the warnings could result in injury or death. Contact your Caterpillar dealer for replacement manuals. Proper care is your responsibility.

Jump Start Cables

Illustration 3 g00408355

There are two warning signs. One warning sign is located in the battery compartment. The other warning sign is located on the left, front frame rail.

⚠ WARNING

Improper jumper cable connections can cause explosion resulting in personal injury.

Batteries may be located in separate compartments. When using jumper cables, always connect positive (+) cable to positive (+) terminal of battery connected to starter solenoid and negative (–) cable from external source to starter negative (–) terminal (if machine not equipped with starter negative terminal, connect to engine block.) Follow procedure in the operation manual.

Electrical Shock Hazard

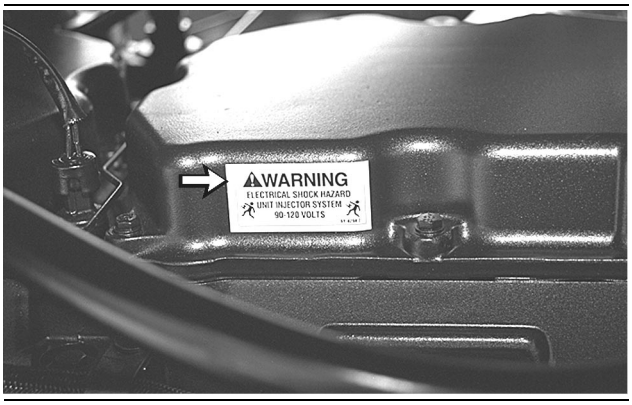

Illustration 4 g00408356

The warning sign is located on the engine.

⚠ WARNING

Electrical shock hazard. Unit injector system 90-120 volts.

Belt Tension

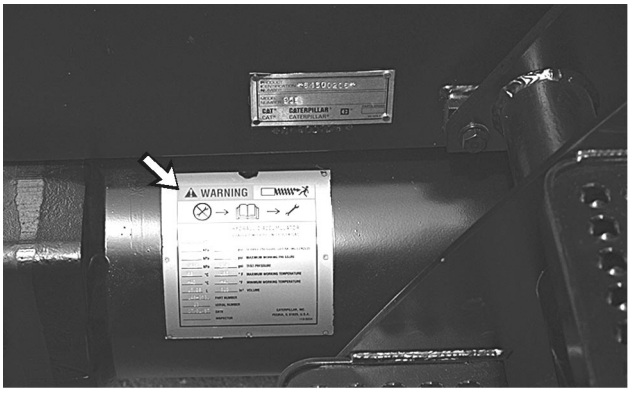

Illustration 5 g00408357

The warning sign is located on each belt tension cylinder.

⚠ WARNING

Spring force can cause personal injury or death.

Do not repair until you have read the Operation and Maintenance Manual.

Ground Speed Sensor

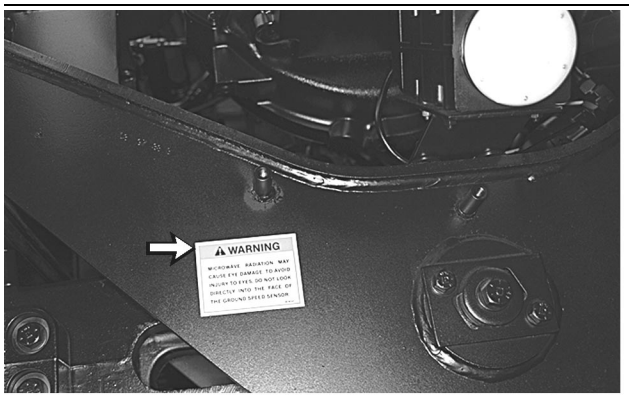

Illustration 6 g00408358

The warning sign is located below the ground speed sensor (if equipped).

⚠ WARNING

Microwave radiation may cause eye damage. To avoid injury to eyes, do not look directly into the face of the ground speed sensor.

Rollover Protective Structure (ROPS)

Illustration 7 g00408359

The warning sign is located under the cab roof above the door.

⚠ WARNING

Structural damage, an overturn, modification, alteration, or improper repair can impair this structure's protection capability thereby voiding this certification. Do not weld on or drill holes in the structure. Consult a Caterpillar dealer to determine this structure's limitations without voiding its certification.

Three-Point Hitch

Illustration 8 g00408361

The warning sign is located in the operator's compartment on the door.

⚠ WARNING

Unexpected hitch movement during implement coupling or uncoupling can occur. To prevent personal injury the hitch control must be set in the manual mode while coupling or uncoupling implements. Consult the Operation and Maintenance Manual for complete three-point hitch operating instructions.

Improperly Coupled Implements

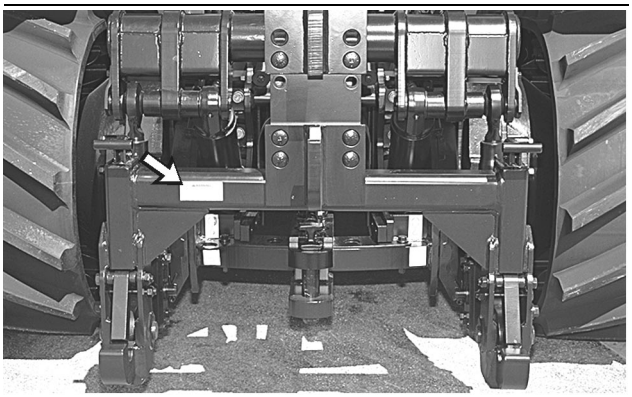

Illustration 9 g00408360

The warning sign is located on the quick hitch (if equipped).

⚠ WARNING

Personal injury could result from improperly coupled implements. Be certain latches are fully engaged on both sides before transporting or pulling the implement.

Power Take-Off

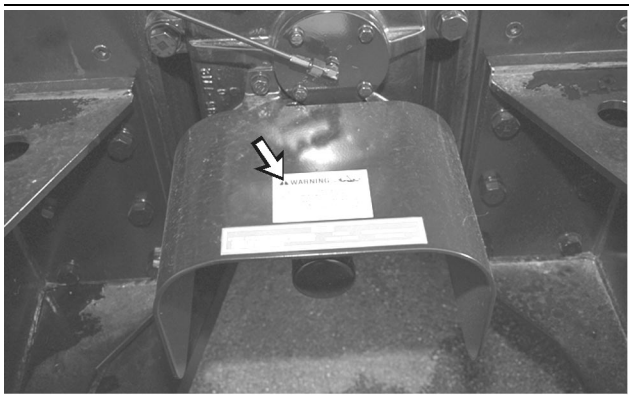

Illustration 10 g00408362

The warning sign is located above the shield for the power take-off.

WARNING

To avoid personal injury due to entanglement with rotating shaft, keep PTO master cover and all power drive system covers in place. Install PTO shaft guard when the system is not in use.

Brake Accumulator

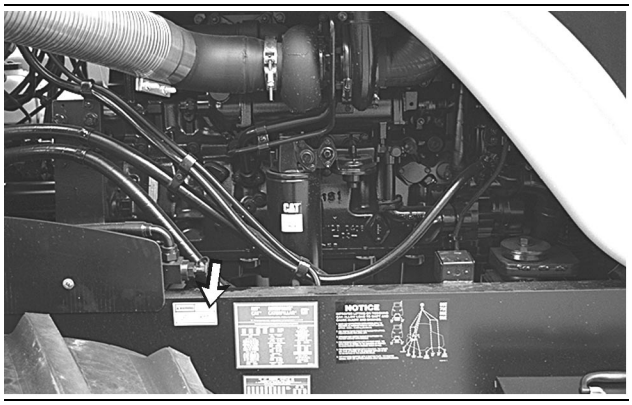

Illustration 11 g00408363

The warning sign is located on the left side of the frame.

WARNING

Relieve accumulator pressure before removing or attaching any service tooling.

High Pressure Cylinder

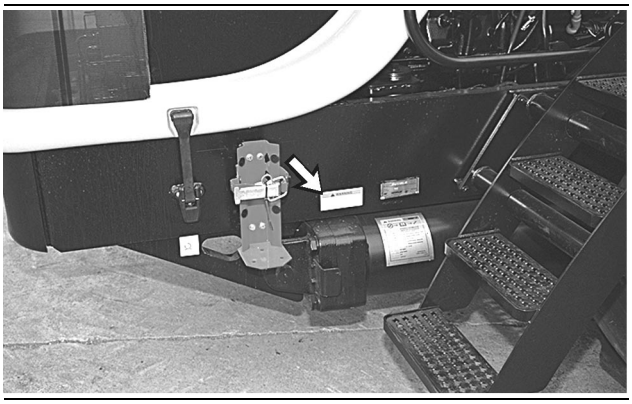

Illustration 12 g00408364

The warning sign is located above the belt tension cylinders.

WARNING

High pressure cylinder: Do not remove any parts until all hydraulic pressure has been relieved to avoid possible personal injury. To relieve pressure, slowly open bleeder valve up to one turn maximum to discharge hydraulic oil.

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General Hazard Information

SMCS Code: 7000

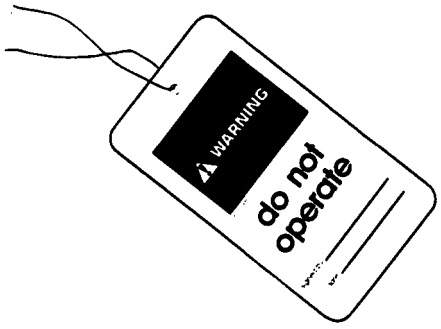

Illustration 13 g00037887

Attach a Special Instruction, SEHS7332, “Do Not Operate” warning tag or a similar warning tag to the start switch or to the controls before you service the machine or before you repair the machine. These warning tags are available from your Caterpillar dealer.

When the engine is running and the steering wheel is turned, the machine will turn with the transmission in NEUTRAL and the parking brake engaged.

Do not start the engine until the area is free of personnel. This will aid in avoiding personal injury due to unexpected machine movement.

If necessary, apply the service brakes in order to counteract any steering when you start the engine.

Know the width of your equipment in order to maintain proper clearance when you operate the machine near fences or near boundary obstacles.

Wear a hard hat, protective glasses, and other protective equipment, as required.

Do not wear loose clothing or jewelry that can snag on controls or on other parts of the machine.

Make sure that all protective guards and all covers are secured in place on the machine.

Keep the machine free from foreign material. Remove debris, oil, tools, and other items from the deck, from walkways, and from steps.

Secure lunch boxes, tools, and other loose items that are not a part of the machine.

Know the appropriate work site hand signals and the personnel that are authorized to give the hand signals. Accept hand signals from one person only.

Never put maintenance fluids into glass containers. Drain all liquids into a suitable container.

Discard any drained fluids and discard any filter elements according to local regulations.

Use all cleaning solutions with care.

Report all necessary repairs.

Do not allow unauthorized personnel on the machine.

Do not smoke when you service an air conditioner. Also, do not smoke if refrigerant gas may be present. Inhaling the fumes that are released from a flame that contacts air conditioner refrigerant can cause bodily harm or death. Inhaling gas from air conditioner refrigerant through a lighted cigarette can cause bodily harm or death.

Unless you are instructed otherwise, perform the maintenance under the following conditions:

- The machine is parked on level ground.
- The implements are lowered to the ground.
- The transmission control is in the NEUTRAL position.
- The parking brake is engaged.
- The engine is stopped.
- The engine start switch key is turned off and the engine start switch key is removed.
- Allow the machine to cool.

Pressure Air

Pressure air can cause personal injury. When pressure air is used for cleaning, wear a protective face shield, protective clothing, and protective shoes.

The maximum air pressure for cleaning purposes must be below 205 kPa (30 psi).

Fluid Penetration

Always use a board or cardboard when you check for a leak. Leaking fluid that is under pressure can penetrate body tissue. Fluid penetration can cause serious injury and possible death. A pin hole leak can cause severe injury. If fluid is injected into your skin, you must get treatment immediately. Seek treatment from a doctor that is familiar with this type of injury.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the machine. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Tools and Shop Products Guide”, for tools and supplies suitable to collect and contain fluids in Caterpillar machines.

Dispose of all fluids according to local regulations and mandates.

Asbestos Information

Caterpillar equipment and replacement parts that are shipped from Caterpillar are asbestos free. Caterpillar recommends the use of only genuine Caterpillar replacement parts. Use the following guidelines when you handle any replacement parts that contain asbestos or when you handle asbestos debris.

Use caution. Avoid inhaling dust that might be generated when you handle components that contain asbestos fibers. Inhaling this dust can be hazardous to your health. The components that may contain asbestos fibers are brake pads, brake bands, lining material, clutch plates, and some gaskets. The asbestos that is used in these components is usually encased in a resin. The asbestos may also be sealed. Handling the asbestos is not hazardous unless airborne dust that contains asbestos is generated.

If dust which may contain asbestos is present, there are several guidelines that should be followed.

Never use compressed air for cleaning. Avoid brushing materials that contain asbestos or grinding materials that contain asbestos. Use a wet method to clean up asbestos debris. A vacuum that is equipped with the high efficiency particulate air filter (HEPA filter) can also be used.

Use exhaust ventilation on permanent machining jobs.

Wear an approved respirator if there is no other way to control the dust.

Comply with applicable rules and regulations for the work place. In the USA, use Occupational Safety and Health Administration requirements. These OSHA requirements can be found in “29 CFR 1910.1001”.

Obey environmental regulations for disposal of asbestos.

Stay away from areas that might have asbestos particles in the air.

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Crushing Prevention and Cutting Prevention

SMCS Code: 7000

Support the equipment properly when you perform work beneath the equipment. Do not depend on the hydraulic cylinders to hold up the equipment. An implement can fall if a control lever is moved or if a hydraulic line breaks.

Never jump across the starter solenoid terminals in order to start the machine. Unexpected machine movement could result.

Never attempt adjustments while the machine is moving or while the engine is running.

Whenever there are attachment linkages, the clearance in the linkage area will change with movement of the attachment.

Stay clear of all rotating parts and all moving parts.

Keep objects away from moving fan blades. The fan blades will throw objects and the fan blades can cut objects.

Do not use a wire rope cable that is kinked or frayed. Wear gloves when you handle wire rope cable.

When you strike a retainer pin, the retainer pin might fly out. The loose retainer pin can injure personnel. Make sure that there are no people in the area when you strike a retainer pin. To avoid injury to your eyes, wear protective glasses when you strike a retainer pin.

Chips or other debris may fly off objects when you strike the objects. Make sure that no one will be injured by flying debris before you strike any object.

Rollover Protective Structure (ROPS) or Falling Objects Protective Structure (FOPS)

These structures are secured to the machine above the operator compartment.

To avoid the possible weakening of the ROPS or FOPS, consult your Caterpillar dealer before you alter the structures. Do not alter the structure by welding, cutting, adding weight, or drilling holes into the structure.

Any alteration that is not specifically authorized by Caterpillar invalidates the Caterpillar certification for the ROPS or for the FOPS. The protection that is offered by the ROPS will be impaired if the ROPS has structural damage. Damage to the structure can be caused by an overturn or by falling objects.

Do not mount items (fire extinguishers, first aid kits, work lights, etc) by welding any brackets to the ROPS or by drilling holes in the ROPS. See your Caterpillar dealer for mounting guidelines.

i00721004

Burn Prevention

SMCS Code: 7000

Coolant

When the engine is at operating temperature, the engine coolant is hot and the engine coolant is under pressure. The radiator and all lines to the heaters or to the engine contain hot coolant or steam. Any contact with hot coolant or with steam can cause severe burns.

Only check the coolant level after the engine has been stopped. Make sure that the radiator cap is cool before you remove the radiator cap with your bare hand. Remove the radiator cap slowly in order to relieve pressure.

Cooling system conditioner contains alkali. Alkali can cause personal injury. Do not allow alkali to contact the skin, the eyes, or the mouth.

Allow cooling system components to cool before you drain the cooling system.

Oils

Hot oil and hot components can cause personal injury. Do not allow hot oil or hot components to contact the skin.

When the hydraulic system is at operating temperature, the hydraulic oil is hot and the hydraulic oil is under pressure.

Make sure that the hydraulic tank filler cap is cool before you remove the hydraulic tank filler cap with your bare hand. Remove the hydraulic tank filler cap slowly in order to relieve pressure.

Relieve all pressure in the air system, in the oil system, in the fuel system, or in the cooling system before you disconnect any lines, fittings, or related items.

Batteries

Batteries give off flammable fumes which can explode.

Do not smoke while you are observing the battery electrolyte levels.

Electrolyte is an acid. Electrolyte can cause personal injury. Do not allow electrolyte to contact the skin or the eyes.

Always wear protective glasses when you work on batteries.

i01183498

Fire Prevention and Explosion Prevention

SMCS Code: 7000

All fuels, most lubricants, and some coolant mixtures are flammable. Leaking fuel or fuel that is spilled onto hot surfaces or onto electrical components can cause a fire.

Do not smoke while you refuel the machine or while you are in a refueling area. Do not smoke in battery charging areas, or in areas that contain flammable material.

Batteries may be installed in separate compartments. When you use jump start cables, always connect the positive “+” jump start cable to the positive “+” terminal of the battery that is connected to the starter solenoid. Connect the negative “–” jump start cable from the external power source to the negative “–” terminal of the starter.

See the Operation and Maintenance Manual, “Starting with Jump Start Cables” for specific starting instructions.

Clean all electrical connections and tighten all electrical connections. Check the electrical wires daily for wires that are loose or frayed. Tighten all loose electrical wires before you operate the machine. Repair all frayed electrical wires before you operate the machine.

Store all fuels and all lubricants in properly marked containers and away from all unauthorized persons. Store oily rags and other flammable material in a protective container.

Do not weld pipes or tubes if these components contain flammable fluids. Do not flame cut pipes or tubes if these components contain flammable fluids. Before you weld pipes or tubes or before you flame cut pipes or tubes, clean the pipes or tubes thoroughly with nonflammable solvent.

Remove all flammable materials before the flammable materials accumulate on the machine.

Do not expose the machine to flames.

Protective shields must be installed correctly. If a line, a tube, or a seal ruptures, these shields protect hot exhaust components from oil spray or from fuel spray.

Ether

Ether is poisonous and flammable. Inhaling ether vapors or repeated contact with skin can cause personal injury. Use ether only in well ventilated areas. Do not smoke while you install ether cylinders. To avoid fires, use ether carefully.

Do not store ether cylinders in living areas or in the operator compartment. Do not store ether cylinders in direct sunlight or at temperatures above 49 °C (120 °F). Discard ether cylinders in an approved place. Do not puncture ether cylinders. Do not burn ether cylinders. Keep ether cylinders away from unauthorized personnel.

Lines, Tubes and Hoses

Do not bend high pressure lines. Do not strike high pressure lines. Do not install lines, tubes or hoses if these hoses are damaged.

Repair lines, tubes and hoses if any of these parts are loose or damaged. Leaks can cause fires. See your Caterpillar dealer for repairs or for replacement parts.

Check lines, tubes and hoses carefully. Do not use your bare hand to check for leaks. Use a board or cardboard to check for leaks. See Operation and Maintenance Manual, “General Hazard Information” for details about fluid penetration. Tighten all connections to the recommended torque.

Replace the parts if any of the following conditions exist:

- The end fittings are damaged, or the end fittings are leaking.
- The outer covering is chafed or cut.
- The wire shield is exposed.
- The outer covering is ballooning locally.
- The flexible part of a hose is kinked or crushed.
- The armoring is embedded in the outer cover.

Make sure that all clamps, all guards, and all heat shields are installed correctly in order to prevent vibration, rubbing against other parts, and excessive heat during operation.

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Fire Extinguisher Location

SMCS Code: 7000; 7419

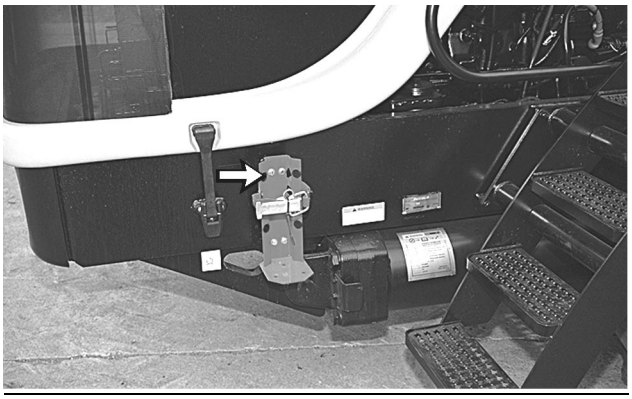

Illustration 14 g00364892

Make sure that a fire extinguisher is available. Be familiar with the operation of the fire extinguisher. Inspect the fire extinguisher and service the fire extinguisher regularly. Obey the recommendations on the instruction plate.

Do not weld a bracket on the ROPS in order to install the fire extinguisher. Also, do not drill holes in the ROPS in order to mount the fire extinguisher on the ROPS.

One mounting bracket is provided. The mounting bracket is on the left frame rail toward the front. For the information on the mounting of this bracket, consult any Caterpillar dealer. The bracket is designed to hold a 127 mm (5 inch) extinguisher that weighs 4.5 kg (10 lb).

i00721379

Electrical Storm Injury Prevention

SMCS Code: 7000

When lightning is striking in the near vicinity of the machine, the operator should never attempt the following procedures:

- Mount the machine.
- Dismount the machine.

If you are in the operator's station during an electrical storm, stay in the operator's station. If you are on the ground during an electrical storm, stay away from the vicinity of the machine during an electrical storm.

i00721426

Mounting and Dismounting

SMCS Code: 7000

Mount the machine and dismount the machine only at locations that have steps and/or handholds. Before you mount the machine, clean the steps and the handholds. Inspect the stairs and handholds. Make any necessary repairs.

Face the rear of the machine whenever you mount the machine and whenever you dismount the machine.

Maintain a three-point contact with the steps and with handholds.

Note: Three-point contact can be two feet and one hand. Three-point contact can also be one foot and two hands.

Never mount a moving machine. Never dismount a moving machine. Never jump off the machine.

Do not carry tools or supplies when you try to mount the machine or when you try to dismount the machine. Use a hand line to pull equipment onto the platform.

Do not use any controls as handholds when you enter the operator compartment or when you exit the operator compartment.

Alternate Exit

Machines that are equipped with cabs have alternate exits. For additional information, see Operation and Maintenance Manual, "Windows".

i00733633

Before Starting Engine

SMCS Code: 1000; 7000

Start the engine only from the operator compartment. Never short across the starter terminals or across the batteries. Shorting could damage the electrical system by bypassing the engine neutral start system.

Inspect the condition of the seat belt and of the mounting hardware. Replace any parts that are worn or damaged. Regardless of appearance, replace the seat belt after three years of use. Do not use a seat belt extension on a retractable seat belt.

Adjust the seat so that full pedal travel can be achieved with the operator's back against the back of the seat.

Note: If the seat's fore/aft lever is used, make sure that the full pedal travel can be obtained when the seat is fully rearward.

Make sure that the machine is equipped with a lighting system that is adequate for the job conditions. Make sure that all machine lights are working properly. Before you start the engine and before you move the machine, make sure that no one is underneath the machine, around the machine, or on the machine. Make sure that the area is free of personnel.

i00733695

Engine Starting

SMCS Code: 1000; 7000

If a warning tag is attached to the engine start switch or to the controls, do not start the engine. Also, do not move any controls.

Move all hydraulic controls to the HOLD position before you start the engine. Move the transmission control lever to the NEUTRAL position.

Engage the parking brake.

Diesel engine exhaust contains products of combustion which can be harmful to your health. Always run the engine in a well ventilated area. If you are in an enclosed area, vent the exhaust to the outside.

Start the engine only from the operator compartment. Never short across the starter terminals or across the batteries. Shorting could damage the electrical system by bypassing the engine neutral start system.

When the engine is running and the steering wheel is turned, the machine will turn with the transmission in NEUTRAL and the parking brake engaged.

Do not start the engine until the area is free of personnel. This will aid in avoiding personal injury due to unexpected machine movement.

If necessary, apply the service brakes in order to counteract any steering that might occur when you start the engine.

i00733843

Before Operating Machine

SMCS Code: 7000

Clear all personnel from the machine and from the area.

Clear all obstacles from the machine's path. Beware of hazards (wires, ditches, etc).

Be sure that all windows are clean. Secure the doors and the windows in the open position or in the shut position.

Adjust the rearview mirrors for the best visibility close to the machine. Make sure that the horn, the backup alarm (if equipped), and all other warning devices are working properly.

Fasten the seat belt securely.

i00785741

Machine Operation

SMCS Code: 7000

Only operate the machine while you are in a seat. The seat belt must be fastened while you operate the machine. Only operate the controls while the engine is running.

Check for proper operation of all controls and of all protective devices while you operate the machine slowly in an open area.

Make sure that no one will be endangered before you move the machine. Do not allow riders on the machine unless the machine has the following equipment:

- Additional seat
- Additional seat belt
- Rollover Protective Structure (ROPS)

Report any machine damage that was noted during machine operation. Make any necessary repairs.

Hold attachments approximately 40 cm (15 inches) above ground level while you drive the machine. Do not drive the machine near an overhang, near the edge of a cliff, or near the edge of an excavation.

If the machine begins to sideslip on a grade, immediately dispose of the load and turn the machine downhill.

Be careful to avoid any ground condition which could cause the machine to tip. Machine rollover can occur when you work on hills, on banks, or on slopes. Machine rollover can also occur when you cross ditches, ridges, or other unexpected obstacles.

When possible, operate the machine up slopes and down slopes. Avoid operating the machine across the slope, when possible.

Keep the machine under control. Do not overload the machine beyond capacity.

Make sure that the towing devices are adequate for the application. Make sure that the draft arm hitch points are adequate for the application.

Connect trailing equipment only to a drawbar or to a hitch.

Never straddle a wire rope cable. Never allow other personnel to straddle a wire rope cable.

When you maneuver in order to connect the equipment, make sure that no personnel are between the machine and trailing equipment. Block up the hitch of the trailing equipment in order to align the equipment with the drawbar.

Know the maximum dimensions of your machine.

When you operate on icy roads, reduce travel speed.

After operating in muddy conditions, allow sufficient time for the belts to reject debris and moisture before making high speed maneuvers. Belts that are wet and belts that are muddy may impede the machine's steering.

If machine stability is noticeably affected, reduce travel speed.

Select a gear that will control machine speed when you descend a hill. Downshift if braking is required to control machine speed. Never coast down a hill with the transmission in NEUTRAL.

Do not steer the machine when you cross ditches. Ditches that are wide and/or ditches that are deep may allow guide blocks to sag below the midwheels. This can cause the belt to come off.

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Machine Parking

SMCS Code: 7000

Park on a level surface. If you must park on a grade, chock the machine's belts.

Move the transmission control lever to the NEUTRAL position.

Engage the parking brake.

Lower all implements to the ground.

Move the implement controls to the HOLD position.

Move the three-point hitch mode switch (if equipped) to the manual mode.

Stop the engine.

Turn the engine start switch to the OFF position and remove the engine start switch key.

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Guards (Operator Protection)

SMCS Code: 7150

There are different types of guards that are used to protect the operator. The machine and the machine application determines the type of guard that should be use.

A daily inspection of the guards is required in order to check for structures that are bent, cracked or loose. Never operate a machine with a damaged structure.

The operator becomes exposed to a hazardous situation if the machine is used improperly or if poor operating techniques are used. This situation can occur even though a machine is equipped with an appropriate protective guard. Follow the established operating procedures that are described in the Operation and Maintenance Manual, "Operating Techniques" information.

Rollover Protective Structure (ROPS), Falling Object Protective Structure (FOPS) or Tip Over Protection Structure (TOPS)

The ROPS/FOPS Structure on your machine is specifically designed, tested and certified for that machine. Any alteration or any modification to the ROPS/FOPS Structure could weaken the structure. This places the operator into an unprotected environment. Modifications or attachments that cause the machine to exceed the weight that is stamped on the certification plate also place the operator into an unprotected environment. Excessive weight may inhibit the brake performance, the steering performance and the ROPS. The protection that is offered by the ROPS/FOPS Structure will be impaired if the ROPS/FOPS Structure has structural damage. Damage to the structure can be caused by an overturn, a falling object, a collision, etc.

Do not mount items (fire extinguishers, first aid kits, work lights, etc) by welding brackets to the ROPS/FOPS Structure or by drilling holes in the ROPS/FOPS Structure. Welding brackets or drilling holes in the ROPS/FOPS Structures can weaken the structures. Consult your Caterpillar dealer for mounting guidelines.

The Tip Over Protection Structure (TOPS) is another type of guard that is used on some smaller machines. This structure protects the operator in the event of a tipover. The same guidelines for the inspection, the maintenance and the modification of the ROPS/FOPS Structure are required for the Tip Over Protection Structure.

Flying Object or Falling Object Guard (If Equipped)

Logging, demolition and other specific applications require special flying or falling operator protection. It is recommended that safety glasses be worn in addition to the flying or falling object guard.

A flying object guard needs to be installed when a work tool that creates flying objects is used. Mesh front guards that are approved by Caterpillar are available for machines with a cab or an open canopy. On machines that are equipped with cabs, the windshield should also be closed.

When you perform demolition applications that are above the top of the cab or you perform logging applications, Caterpillar recommends the installation of a falling object guard structure. The falling object guard structure protects the front of the structure and the top of the structure.

Additional guards may be required for specific applications or work tools. An example of the additional guards is a polycarbonate window that may have a front screen cover or a guard. The Operation and Maintenance Manual for your machine or your work tool will provide specific requirements for the guards. Consult your Caterpillar dealer for additional information.